

a spiral; it is the oblique or spiral type. . . . What characterize them all are not only the oblique relations of right and left, but also the presence of one or more peculiar contractile bodies, the so-called contractile vesicles, and a diffuse digestive system." He describes, in the ninth chapter, how the sinuses of the digestive cavity in certain Infusoria came to be described by Ehrenberg as saccules or pouches. In treating of the Mollusca, he agrees with Oken in regarding as the rudiment of a left valve, homologous with that of a Lamellibranch, the operculum of the operculated Gasteropods. At the same time he makes no allusion to the absence of correspondence between these two organs in respect of the relative periods of their formation. The Articulata are briefly touched upon in the twelfth chapter. He there shows some good reason for the promotion of the Sipunculoids to the Worms. The Diptera are placed by him at the top of the branch, on account of the extreme concentration of their bodies and the versatility of their heads. It is questionable, however, whether this is their true position, notwithstanding these points in their organization, because the typical form of the Insecta proper seems upon the whole to be four-winged, from which the abortion of the posterior pair constitutes a marked deviation; and it would be quite an exceptional circumstance were an abnormal group to constitute the highest of its class, to say nothing of a branch. The division of the body into three groups of segments, and the versatility of the head, obtain to an equal extent in the Hymenoptera. Professor Agassiz's arguments in favour of the supremacy of the Lepidoptera are not yet shown to be fallacious; and though in some particulars their organization may seem to be inferior, in others (*e. g.* antennæ) it is of a grade decidedly superior to that of the Diptera.

The third part is devoted to the embryology of the five branches of the animal kingdom.

Many other details are worthy of notice; and, excepting some obtrusive claims to originality, and some personalities, the book is pleasantly written and well worth reading.

#### MISCELLANEOUS.

*On the Organization of Cryptoprocta ferox.* By MM. A. MILNE-EDWARDS and A. GRANDIDIER.

CRYPTOPROCTA FEROX was completely unknown when in 1833 the English zoologist Bennett received a specimen of it, to which he called the attention of naturalists; but this unique specimen was so young that it was impossible to ascertain its precise zoological affinities, the dental system having not yet acquired its definitive form. Bennett thought the species should be placed in the family Viverridæ, close to the *Paradoxuri*, although he indicated some points of resemblance to the Felidæ.

Blainville obtained a drawing of the skull of this young individual,

which he figured in his 'Ostéographie.' He had the same opinion as Bennett with regard to its affinities.

M. A. Grandidier, in his travels in the south-east of Madagascar, obtained the skin and two skeletons of the animal; and the study of the adult dental system shows that *Cryptoprocta* cannot remain in the place assigned to it by Bennett. The Viverridæ are characterized by the existence of two tubercular posterior molars in the upper jaw, and one in the lower jaw. In *Cryptoprocta* the upper jaw has only one of these teeth, and the lower jaw has none.

The incisors are six in each jaw; in the upper jaw the outer ones are very strong, not so large as in the hyænas, but equal in proportion to those of the genus *Felis*. In the lower jaw the space occupied by the incisors is very narrow; and these teeth are arranged in two rows, the second clearly behind the others, as in the weasels and martens. This double row of incisors occurs also in some species of Felidæ; but in these the second row is in front of the others.

The canines are large, pointed, very firmly implanted in the maxillary bones, and both in form and direction resemble those of the Felidæ rather than those of the Viverridæ.

There are in each jaw five molars, placed as follows:—

premolars  $\frac{3}{4}$ , flesh-tooth  $\frac{1}{4}$ , tubercular  $\frac{1}{6}$ .

This dental formula differs from that of the cats only in the presence of one additional premolar in the upper jaw and of two in the lower jaw. But it is to be remarked that this difference tends to be effaced by the advance of age, as the first premolar in both jaws falls out soon after its appearance, and, its alveolus being obliterated, there is no trace of it in old individuals.

The flesh-teeth are trenchant and compressed so as to act like the blades of scissors, and thus have a perfectly feline aspect; the constant sharpness of their prehensile margin shows that they are employed only in cutting flesh. The upper flesh-tooth has a tubercle at its anterior inner part, much weaker and less marked than in the hyænas. The lower flesh-tooth has a lobe behind, analogous to but much smaller than that of the hyænas; nor does it present any trace of the inner tubercle which gives such a peculiar aspect to this tooth in the hyænas.

The characters of the remainder of the skeleton are in accordance with those of the dental system, and enable the position of the genus *Cryptoprocta* to be determined from the consideration of the whole. Its dentition separates it clearly from all the Viverridæ, and indicates an animal with more ferocious habits; with one premolar less in the lower jaw (leaving out of consideration the deciduous teeth), the cranium would differ in nothing from that of the cats.

But *Cryptoprocta ferox* is a perfectly plantigrade carnivore; and it must, therefore, be separated from the cats, notwithstanding the analogy of its dentition. The group of the Felidæ is one of the most natural in the animal kingdom, and constitutes rather one great genus than a family; and we should deprive it of its natural

character and violate its limits, if we introduced into it an animal with so singular a structure as *Cryptoprocta*.

This animal must, therefore, form a peculiar group approaching most nearly to the cats; and in order to represent exactly the relations which it has to the genus *Felis*, it would seem necessary to unite it with those animals in a tribe which would then be subdivided into two families, one including the digitigrade, and the other the plantigrade Felinæ.—*Comptes Rendus*, August 5, 1867, pp. 232–235: abstract.

*A way to determine Trichopterous Pupæ.*

By A. E. EATON, Trin. Coll. Cam.

Having been asked in what way the pupa-skin described in the last June Number of this Magazine was ascertained to be that of *Brachycentrus subnubilus*, Curt., without rearing the insect, I will briefly indicate it, with a view to the removal of any doubt that may be entertained respecting the correctness of the determination. 1st, by observing what species is, or are, most abundant in a certain locality at a given time; 2ndly, by collecting from patches of weeds the sloughs of pupæ, and putting together those which correspond in size; 3rdly, by making a comparison between the leg-spurs, the neuration of the wings, and the palpi of the slough and those of the adult state of the most probable species, it is not difficult to refer a pupa-skin to the proper insect. This done, by dredging up occupied caddis-cases, the living pupa (and thus the case also) of the species can be discovered.

*On the Spontaneous Movements of the Leaves of Colocasia esculenta (Schott), and on the Ejection of Water from them in a continuous jet.* By M. MUSSET.

M. Lecoq has published\*, in the 'Comptes Rendus' of the 22nd of last April, some very interesting observations on the spontaneous movements of the leaves of *Colocasia esculenta* (Schott).

"Several times he had the opportunity of witnessing violent fits of shaking, among others on the 20th of January and 2nd of March. On the latter day, in the morning, although the temperature of the stove was lowered to 7° C. (=45°·6 F.), the agitation was considerable in all the leaves, both old and new, without exception: it is an actual febrile movement, a very violent shivering."

These facts, except as regards intensity, are identical with those that I have sometimes witnessed, in observing the ejection of water by the leaves in vernalization of *Colocasia esculenta* †. This was sometimes a sort of vibration impressed upon the convoluted and erected leaf, sometimes a waving of the expanded leaf, sometimes a rustling in the interior of the mass, which was composed of a hundred leaves of every dimension, from 0·1 to 1·10 metre in length.

\* See *Annals*, ser. 3. vol. xix. p. 439.

† See 'Comptes Rendus,' tome lxi. p. 682, October 23, 1865, and my memoir in 'Ann. de l'Acad. des Sciences de Toulouse,' 1866.